AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Previously Presented) A method for controlling a crane drive unit so as to suppress sway of a load suspended by a rope of a crane, which sway occurs when the load has been transported from a first position to a second position, the control being made by operating a controller having a filter unit using a feedforward control program, comprising:

removing a component near a resonance frequency by the filter unit from a transportation command for the load, in which command a maximum value among at least one of a transportation speed, transportation acceleration, and transportation jerk is limited, under the resonance frequency sequentially computed from a rope length that is a distance from the center of rotation of the sway of the rope to the center of gravity of the load and under parameters that relate to a control unit of the crane drive unit and that are previously computed so as not to exceed a performance of the crane drive unit;

wherein based on expression (1) or (2), the component near the resonance frequency is removed by using parameters a_i (f) and b_j (f), which are determined by computing them in a simulation in which a model expressing the characteristics of the crane is used, while changing their values, and which values are stored,

Expression (1)

$$y(t) = b_0(f)x(t) + b_1(f)x(t-1) + b_2(f)x(t-2) + \cdot\cdot\cdot - a_1(f)y(t-1) - a_2(f)y(t-2) - \cdot\cdot\cdot$$

$$y(t) = \sum_{j=0}^{m} b_j(f)x(t-j) - \sum_{i=1}^{n} a_i(f)y(t-i)$$

where a_i (f) and b_j (f) are parameters mediated by the resonance frequency f sequentially computed for the varying length of the rope, and

Expression (2)

$$F(S)=\frac{Y(S)}{X(S)}=\frac{b_0(f)S^0+b_1(f)S^1+b_2(f)S^2+\cdots}{a_0(f)S^0+a_1(f)S^1+a_2(f)S^2+\cdots}=\frac{\sum_{j=0}^{m} b_j(f)S^j}{\sum_{i=0}^{n} a_i(f)S^i}$$

where expression (1) is obtained by carrying out a Z-transformation to the transfer function of the filter shown in expression (2), and S is a Laplacian operator, and

inputting the transportation command from which the component near the resonance frequency is removed into the crane drive unit, thereby controlling the crane drive unit so that the load does not greatly sway when the load is transported from the first position to the second position.

2. (Currently Amended) A system for controlling a crane drive unit so as to suppress sway of a load suspended by a rope of a crane, which sway occurs when the load has been transported from a first position to a second position, the control being made by operating a controller having a filter unit using a feedforward control program, comprising:

a rope length detection unit for detecting a rope length that is a distance from the center of rotation of the sway of the rope to the center of gravity of the load;

a resonance frequency computing unit for computing a resonance frequency of the rope having said rope length;

a transportation command transmitting unit for transmitting a transportation command for the load given by a transportation command applicator;

a parameter computing unit for previously computing parameters for a control unit of the crane drive unit so that the parameters do not exceed a performance of the crane drive unit;

a parameter storing unit for receiving and storing the parameters from the parameter computing unit;

a maximum value limiting unit for limiting a maximum value among at least one of a transportation speed, transportation acceleration, and transportation jerk in the transportation command for the load from the transportation command transmitting unit under the parameters from the parameter storing unit; and

a filter unit for receiving the resonance frequency from the resonance frequency ~~calculating~~computing unit, the filter unit removing a component near the resonance frequency from the transportation command in which the maximum value is limited by the maximum value limiting unit, under the parameters from the parameter storing unit, the filter unit inputting in the crane drive unit the transportation command from which the component near the resonance frequency is removed,

wherein based on expression (1) or (2), the component near the resonance frequency is removed by using parameters a_i (f) and b_j (f), which are determined by computing them in a simulation in which a model expressing the characteristics of the crane is used, while changing their values, and which values are stored,

Expression (1)

$$y(t) = b_0(f)x(t) + b_1(f)x(t-1) + b_2(f)x(t-2) + \cdot\cdot\cdot - a_1(f)y(t-1) - a_2(f)y(t-2) - \cdot\cdot\cdot$$

$$y(t) = \sum_{j=0}^{m} b_j(f)x(t-j) - \sum_{i=1}^{n} a_i(f)y(t-i)$$

where a_i (f) and b_j (f) are parameters mediated by the resonance frequency f sequentially computed for the varying length of the rope, and

Expression (2)

$$F(S) = \frac{Y(S)}{X(S)} = \frac{b_0(f)S^0 + b_1(f)S^1 + b_2(f)S^2 + \cdots}{a_0(f)S^0 + a_1(f)S^1 + a_2(f)S^2 + \cdots} = \frac{\sum_{j=0}^{m} b_j(f)S^j}{\sum_{i=0}^{n} a_i(f)S^i}$$

where expression (1) is obtained by carrying out a Z-transformation to the transfer function of the filter shown in expression (2), and S is a Laplacian operator.

3. (Previously Presented) A medium in which a feedforward control program is stored, the feedforward control program controlling a crane drive unit by a controller having a filter unit so as to suppress sway of a load suspended by a rope of a crane, which sway occurs when the load has been transported from a first position to a second position, the feedforward control program being programmed to cause the filter unit of the controller to remove a component near a resonance frequency from a transportation command for the load, in which command a maximum value among at least one of a transportation speed, transportation acceleration, and transportation jerk is limited, under the resonance frequency sequentially computed from a rope length that is a distance from the center of rotation of the sway of the rope to the center of gravity of the load and under parameters for a control unit of the crane drive unit, which parameters are previously computed so as not to exceed a performance of the crane drive unit, the feedforward control program being also programmed to cause the filter unit to input the transportation command from which the component near the resonance frequency is removed in the crane drive unit,

wherein based on expression (1) or (2), the component near the resonance frequency is removed by using parameters a_i (f) and b_j (f), which are determined by computing them in a simulation in which a model expressing the characteristic of the crane is used, while changing their values, and which values are stored,

Expression (1)

$$y(t) = b_0(f)x(t) + b_1(f)x(t-1) + b_2(f)x(t-2) + \cdots - a_1(f)y(t-1) - a_2(f)y(t-2) - \cdots$$

$$y(t) = \sum_{j=0}^{m} b_j(f)x(t-j) - \sum_{i=1}^{n} a_i(f)y(t-i)$$

where a_i (f) and b_j (f) are parameters mediated by the resonance frequency f sequentially computed for the varying length of the rope, and

Expression (2)

$$F(S) = \frac{Y(S)}{X(S)} = \frac{b_0(f)S^0 + b_1(f)S^1 + b_2(f)S^2 + \cdots}{a_0(f)S^0 + a_1(f)S^1 + a_2(f)S^2 + \cdots} = \frac{\sum_{j=0}^{m} b_j(f)S^j}{\sum_{i=0}^{n} a_i(f)S^i}$$

where expression (1) is obtained by carrying out a Z-transformation to the transfer function of the filter shown in expression (2), and S is a Laplacian operator.

4-7. (Cancelled).